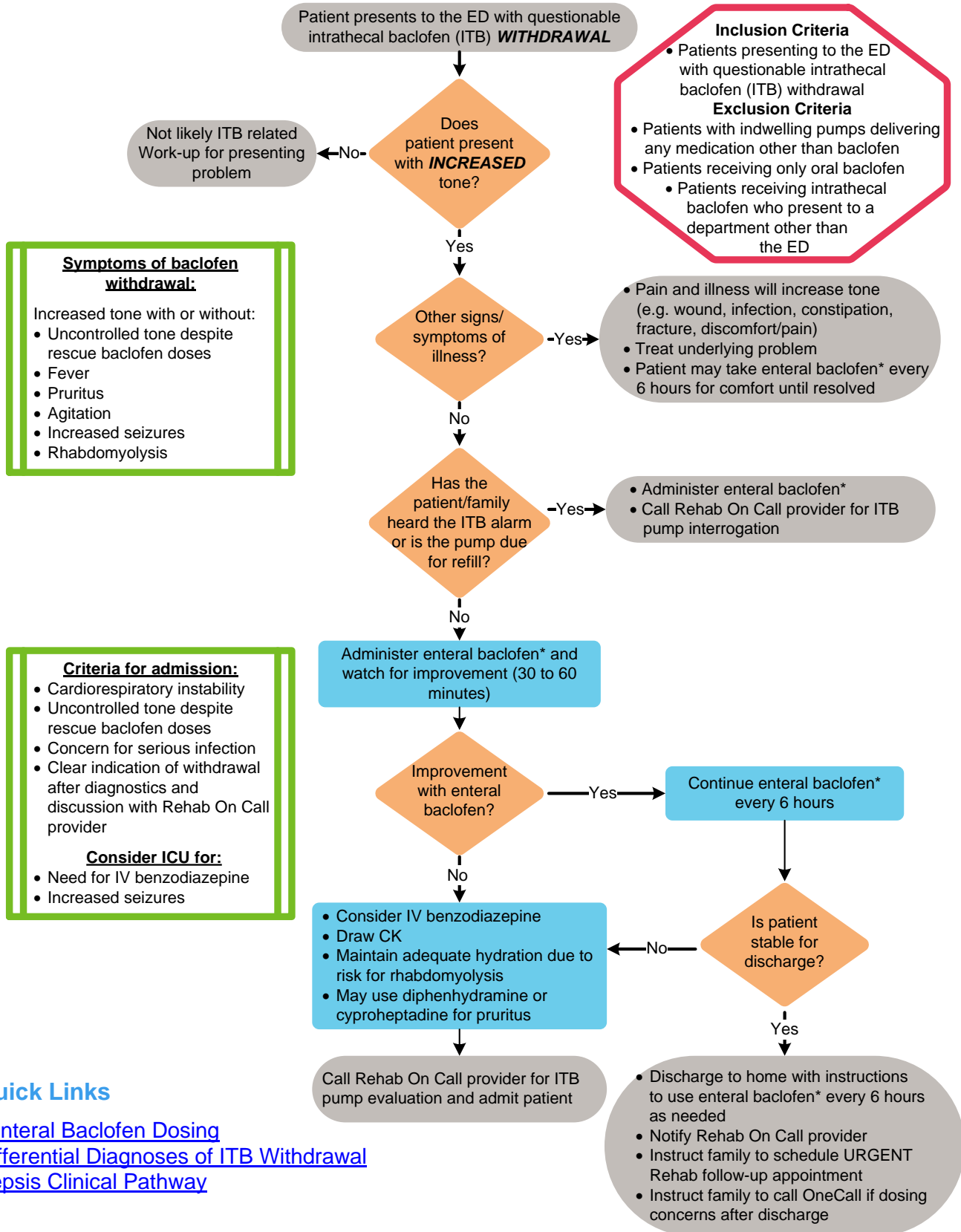


Emergency Department Management of Pediatric Patients Receiving Intrathecal Baclofen

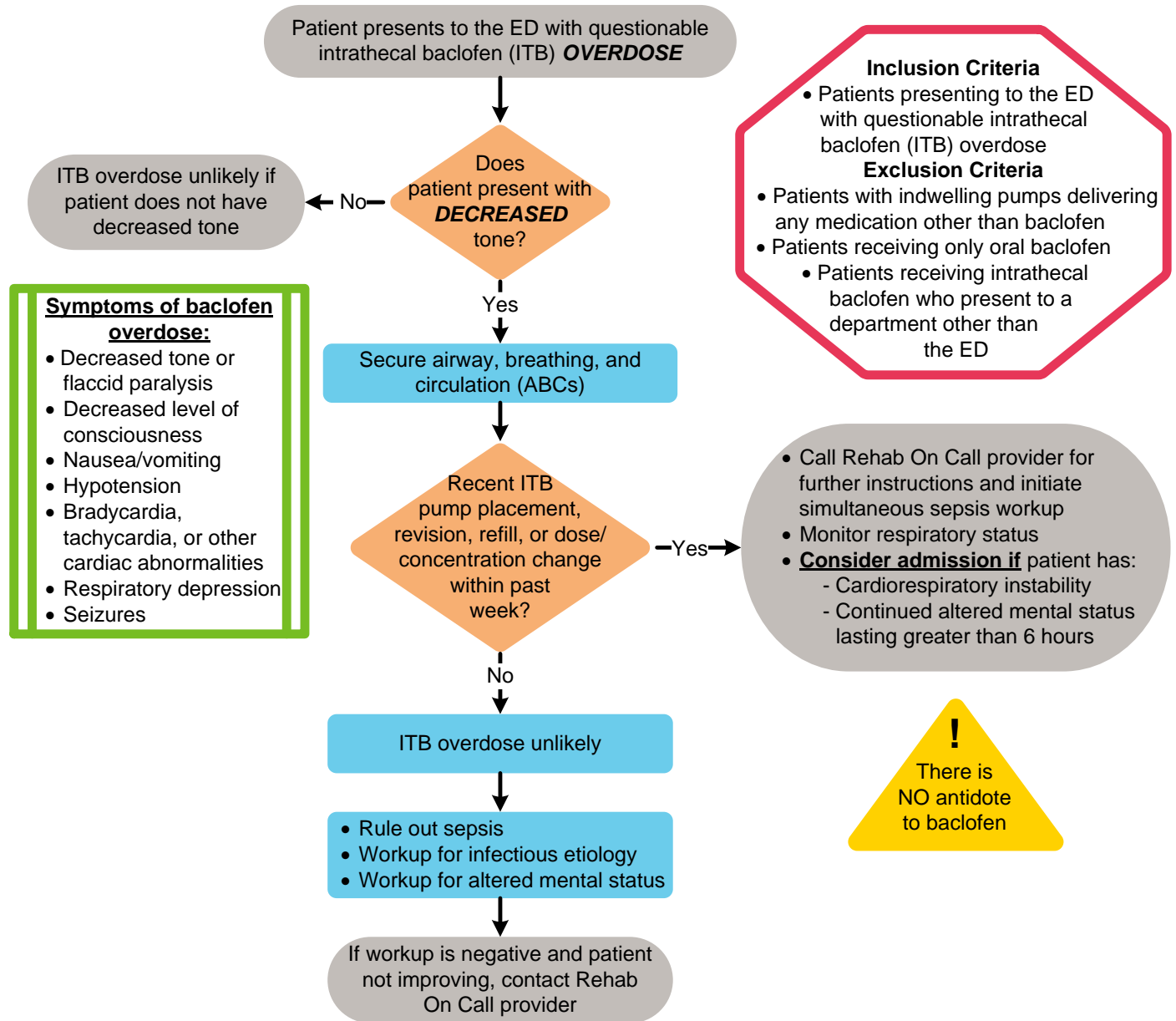
Algorithm 1. Patient presents to ED with questionable intrathecal baclofen **WITHDRAWAL**



Quick Links

- [*Enteral Baclofen Dosing](#)
- [Differential Diagnoses of ITB Withdrawal](#)
- [Sepsis Clinical Pathway](#)

Algorithm 2. Patient presents to ED with questionable intrathecal baclofen **OVERDOSE**



Quick Links

- [Differential Diagnoses of ITB Overdose](#)
- [Sepsis Clinical Pathway](#)

TABLE OF CONTENTS

[Algorithm 1.](#) Patient presents to ED with questionable intrathecal baclofen WITHDRAWAL

[Algorithm 2.](#) Patient presents to ED with questionable intrathecal baclofen OVERDOSE

[Target Population](#)

[Background | Definitions](#)

[Initial Evaluation](#)

[Clinical Management | Withdrawal](#)

[Clinical Management | Overdose](#)

[Therapeutics](#)

[Laboratory Studies | Imaging](#)

Parent | Caregiver Education

[References](#)

[Clinical Improvement Team](#)

TARGET POPULATION

Inclusion Criteria

- Patients receiving intrathecal baclofen who present to the Emergency Department

Exclusion Criteria

- Patients with indwelling pumps delivering any medication other than baclofen
- Patients receiving only oral baclofen
- Patients receiving intrathecal baclofen who present to a department other than the Emergency Department

DEFINITIONS

- ITB: intrathecal baclofen

INITIAL EVALUATION

- What other medications or substances are being taken by the patient, how much and when? Are any of these possibly sedating?
- When was the patient's last ITB pump refill?
- When is the patient's Low Reservoir Alarm Date or next scheduled refill?
- Are there any audible alarms emanating from the pump?
- If there was initially concern for withdrawal, has the patient taken their rescue oral baclofen dose? Were there any effects from that dose?
- Has the patient been ill or experienced other significant symptoms?

CLINICAL MANAGEMENT OF POTENTIAL INTRATHECAL BACLOFEN WITHDRAWAL (ALGORITHM 1)

Noxious stimuli or infection (e.g. pneumonia, otitis media, constipation, hangnail, pressure injury, etc.) can cause an increase in tone and should be considered prior to diagnosing the patient's presentation as ITB withdrawal.

Signs | Symptoms of Potential ITB Withdrawal:

- Increased spasticity, dystonia, clonus or spasms
- Fever
- Tachycardia
- Pruritus
- Paresthesia
- Increased seizures
- Agitation, anxiety, irritability
- Rhabdomyolysis

Note: If the patient does not have any of the signs/symptoms listed above, or is found with any potentially noxious stimuli or infection, their condition is most likely not related to ITB withdrawal. The underlying problem needs to be addressed.

Differential Diagnoses of ITB Withdrawal:

- Noxious pain (e.g. fracture, constipation, wound, infection)
- Autonomic dysreflexia (bradycardia with hypertension, lack of increased spasticity)
- Malignant hyperthermia (after anesthesia, familial disorder)
- Serotonergic syndrome (selective serotonin reuptake inhibitor [SSRI] overdose, myoclonus, elevated liver function tests [LFTs])
- Neuroleptic malignant syndrome (use of dopamine blocking neuroleptic drugs or abrupt withdrawal of dopamine agonist)
- Sepsis
- Meningitis

Monitoring

- Place on cardiorespiratory monitors
- Vital signs every 2 hours
- Pain assessment/re-assessment
- Bladder scan every 4 hours and straight catheterization for bladder volume calculated to be greater than or equal to $[(\text{patient's age} + 2) \times 30 \text{ mL}]$ or greater than or equal to 400 mL. *An indwelling foley is not recommended in the initial management in order to allow for further monitoring of signs of urinary retention*
- If rhabdomyolysis, start IV fluids and monitor renal function and CK

Consults

Contact the Rehabilitation Medicine provider on call for any questions or concerns of diagnostics and management of intrathecal baclofen withdrawal.

CLINICAL MANAGEMENT OF POTENTIAL INTRATHECAL BACLOFEN OVERDOSE (ALGORITHM 2)

The signs/symptoms of ITB overdose are dose dependent on the amount of baclofen being delivered. There is no specific antidote for ITB overdose. ***If suspicion exists for overdose, contact the Rehabilitation Medicine provider.***

Signs | Symptoms of Potential ITB Overdose:

If patient does not have any of the signs/symptoms listed below, their condition is most likely *not* related to ITB.

- Decreased tone or flaccid paralysis
- Decreased level of consciousness
- Nausea/vomiting
- Hypotension
- Bradycardia, tachycardia, or other cardiac abnormalities
- Respiratory depression
- Seizures

Differential Diagnoses of ITB Overdose:

- Sepsis
- Increased intracranial pressure (i.e. intracranial bleed, VP shunt malfunction)
- Hypoglycemia
- Electrolyte imbalance
- Overdose of oral baclofen or a sedating medication or substance other than baclofen

Monitoring

- Place on cardiorespiratory monitors
- Vital signs every 2 hours
- Pain assessment/re-assessment

Consults

If suspicion exists for overdose, contact the Rehabilitation Medicine provider.

THERAPEUTICS

Withdrawal

- Enteral baclofen may be administered as “rescue doses”; monitor for effect. Dosing can be variable from 10-20 mg per dose every 6 hours as needed based on patient response. The following includes dosing stratified by age:
 - 2-7 years old: starting dose 10 mg per dose, then titrate to effect
 - 8 years old or greater: starting dose 20 mg per dose, then titrate to effect
- Diazepam via PO (0.2 to 0.3 mg/kg/dose q6h) or IV (0.04 to 0.3 mg/kg/dose every 2 to 4 hours, Max 0.6 mg/kg, Max 10 mg in a single dose within an 8-hour period) could also be administered for tone reduction.
- Cyproheptadine 4 to 8 mg orally or via G-tube every 6 to 8 hours is effective in symptomatically treating pruritus associated with intrathecal baclofen withdrawal.
- Consider aggressive bowel clean out with administration of softeners and laxatives orally and per rectum if there is suspicion for constipation.

LABORATORY STUDIES | IMAGING

- First-line laboratory studies that are recommended include CK, Comprehensive Metabolic Panel, CBC. *High CK levels would not necessarily be diagnostic.*
- Second-line laboratory studies that could be considered include CRP, ESR, CSF Cytospin [Cell Count & Differential], and CSF culture, particularly if there is concern for an underlying infection contributing to the presentation. *If CSF studies are indicated, a specimen may be obtained via a side-port access performed by a Rehabilitation Medicine provider.*
- See the [sepsis clinical pathway](#) if concerned for sepsis.

Radiology

- Consider brain imaging to rule out ventriculoperitoneal (VP) shunt malfunction.
- Anteroposterior (AP) and lateral views of the spine allow for visualization of the intrathecal catheter, and determination of whether there has been migration of the catheter tip⁴. Current catheter is not radiopaque at the connector site. Visualization of the bowel with the spine x-ray can also help determine stool burden.
- If a spine x-ray is not obtained, a one-view abdominal x-ray is recommended for determining stool burden and need for an aggressive bowel clean-out since constipation is a common trigger for increased spasticity.

REFERENCES



1. Watve SV, Sivan M, Raza WA, Jamil FF. Management of acute overdose or withdrawal state in intrathecal baclofen therapy. *Spinal Cord* 2012;50:107-11.
2. Borowski A, Littleton AG, Borkhuu B, et al. Complications of intrathecal baclofen pump therapy in pediatric patients. *J Pediatr Orthop* 2010;30:76-81.
3. Haranhalli N, Anand D, Wisoff JH, et al. Intrathecal baclofen therapy: complication avoidance and management. *Childs Nerv Syst* 2011;27:421-7.
4. Dvorak EM, McGuire JR, Nelson ME. Incidence and identification of intrathecal baclofen catheter malfunction. *PM R* 2010;2:751-6.
5. Saulino M, Anderson DJ, Doble J, et al. Best practices for intrathecal baclofen therapy: troubleshooting. *Neuromodulation* 2016;19:632-641.

CLINICAL IMPROVEMENT TEAM MEMBERS

- Kim Sawyer**, CPNP-PC | Rehabilitation Medicine
- Susan Apkon**, MD | Rehabilitation Medicine
- Julia Freeman**, MD | Emergency Medicine
- Mackenzie DeVine**, PharmD | Pharmacy
- Michael Barberio**, PharmD | Pharmacy

APPROVED BY

- Clinical Pathways & Measures Committee – October 22, 2019
- Pharmacy & Therapeutics Committee – October 3, 2019
- Medication Safety Committee – Not applicable
- Antimicrobial Stewardship Committee – Not applicable

MANUAL/DEPARTMENT	Clinical Pathways/Quality
ORIGINATION DATE	January 5, 2015
LAST DATE OF REVIEW OR REVISION	October 22, 2019
COLORADO SPRINGS REVIEW BY	 Michael DiStefano, MD Chief Medical Officer, Children's Hospital Colorado-Colorado Springs
APPROVED BY	 Lalit Bajaj, MD, MPH Medical Director, Clinical Effectiveness

REVIEW | REVISION SCHEDULE

Scheduled for full review on October 22, 2023

Clinical pathways are intended for informational purposes only. They are current at the date of publication and are reviewed on a regular basis to align with the best available evidence. Some information and links may not be available to external viewers. External viewers are encouraged to consult other available sources if needed to confirm and supplement the content presented in the clinical pathways. Clinical pathways are not intended to take the place of a physician's or other health care provider's advice, and is not intended to diagnose, treat, cure or prevent any disease or other medical condition. The information should not be used in place of a visit, call, consultation or advice of a physician or other health care provider. Furthermore, the information is provided for use solely at your own risk. CHCO accepts no liability for the content, or for the consequences of any actions taken on the basis of the information provided. The information provided to you and the actions taken thereof are provided on an "as is" basis without any warranty of any kind, express or implied, from CHCO. CHCO declares no affiliation, sponsorship, nor any partnerships with any listed organization, or its respective directors, officers, employees, agents, contractors, affiliates, and representatives.

Discrimination is Against the Law. Children's Hospital Colorado complies with applicable Federal civil rights laws and does not discriminate on the basis of race, color, national origin, age, disability, or sex. Children's Hospital Colorado does not exclude people or treat them differently because of race, color, national origin, age, disability, or sex.

Children's Hospital Colorado provides free aids and services to people with disabilities to communicate effectively with us, such as: Qualified sign language interpreters, written information in other formats (large print, audio, accessible electronic formats, other formats). Children's Hospital Colorado provides free language services to people whose primary language is not English, such as: Qualified interpreters, information written in other languages.

If you need these services, contact the Medical Interpreters Department at 720.777.9800.

If you believe that Children's Hospital Colorado has failed to provide these services or discriminated in another way on the basis of race, color, national origin, age, disability, or sex, you can file a grievance with: Corporate Compliance Officer, 13123 E 16th Avenue, B450, Aurora, Colorado 80045, Phone: 720.777.1234, Fax: 720.777.7257, corporate.compliance@childrenscolorado.org. You can file a grievance in person or by mail, fax, or email. If you need help filing a grievance, the Corporate Compliance Officer is available to help you.

You can also file a civil rights complaint with the U.S. Department of Health and Human Services, Office for Civil Rights, electronically through the Office for Civil Rights Complaint Portal, available at ocrportal.hhs.gov/ocr/portal/lobby.jsf, or by mail or phone at: U.S. Department of Health and Human Services 200 Independence Avenue, SW Room 509F, HHH Building Washington, D.C. 20201 1-800-368-1019, 800-537-7697 (TDD) Complaint forms are available at www.hhs.gov/ocr/office/file/index.html.

Children's Hospital Colorado complies with applicable Federal civil rights laws and does not discriminate on the basis of race, color, national origin, age, disability, or sex.

ATENCIÓN: si habla español, tiene a su disposición servicios gratuitos de asistencia lingüística. Llame al 1-720-777-9800.

CHÚ Ý: Nếu bạn nói Tiếng Việt, có các dịch vụ hỗ trợ ngôn ngữ miễn phí dành cho bạn. Gọi số 1-720-777-9800.

주의: 한국어를 사용하시는 경우, 언어 지원 서비스를 무료로 이용하실 수 있습니다. 1-720-777-9800 번으로 전화해 주십시오

注意: 如果您使用繁體中文, 您可以免費獲得語言援助服務。請致電1-720-777-9800。

ВНИМАНИЕ: Если вы говорите на русском языке, то вам доступны бесплатные услуги перевода. Звоните 1-720-777-9800.

ማስታወሻ: የሚናገሩት ቋንቋ አማርኛ ከሆነ የትርጉም አርዳታ ድርጅቶቹ: በነጻ ሊያግዝዎት ተዘጋጅተዋል። ወደ ሚስተለው ቁጥር ይደውሉ 1-720-777-9800 (መስማት ለተሳናቸው.

ملحوظة: إذا كنت تتحدث انكر اللغة، فإن خدمات المساعدة اللغوية تتوافر لك بالمجان. اتصل برقم 1-720-777-9800 (رقم

ACHTUNG: Wenn Sie Deutsch sprechen, stehen Ihnen kostenlos sprachliche Hilfsdienstleistungen zur Verfügung. Rufnummer: 1-720-777-9800.

ATTENTION : Si vous parlez français, des services d'aide linguistique vous sont proposés gratuitement. Appelez le 1-720-777-9800.

ध्यान दनु होस्त्पाइले नेपाल बोलनहनछ भन तपाइको निम्त भाषा सहायता सवाहरूनःश्लक रूपमा उपलब्ध छ । फोन गनु होसरू 1-720-777-9800 ।

PAUNAWA: Kung nagsasalita ka ng Tagalog, maaari kang gumamit ng mga serbisyo ng tulong sa wika nang walang bayad. Tumawag sa 1-720-777-9800.

注意事項: 日本語を話される場合、無料の言語支援をご利用いただけます。1-720-777-9800 まで、お電話にてご連絡ください。

Nti: O buri na asụ Ibo, asụsụ aka oasụ n'efu, defu, aka. Call 1-720-777-9800.